PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Debendra Das Sharma**

Application No.: 10/011,857	**Group No.: 2111**
Filed: November 05, 2001	**Examiner: Khanh NMN Dang**

For: Method and System for Controlling Flow of Ordered, Pipelined Transactions between Intercommunicating Electronic Devices

Docket No.   :   10017812-1

Commissioner for Patents
Washington, DC. 20231

DECLARATION OF PRIOR INVENTION IN THE UNITED STATES OR IN A NAFTA OR WTO MEMBER COUNTRY TO OVERCOME CITED PATENT OR PUBLICATION (37 C.F.R. § 1.131)

PURPOSE OF DECLARATION

1.   This declaration is to establish completion of the invention in this application in the United States, at a date prior to _____July 3, 2001_____ that is the effective date of the prior art:

_____ publication

_X_ patent

that was cited by the

_X_ examiner.

_____ applicant.

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CERTIFICATE OF MAILING/TRANSMISSION (37 C F.R. § 1.8(a))

I hereby certify that this correspondence is, on the date shown below, being:

MAILING	FACSIMILE
X deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Commissioner for Patents, Washington, D.C. 20231.	__ transmitted by facsimile to the Patent and Trademark Office

Date 08-04-04

Signature

Joanne Bourguignon
(type or print name of person certifying)

NO7E: *"When any claim of application or a patent under reexamination is rejected under 35 U.S.C. 102(a) or (e), or 35 U.S.C. 103 based on a U.S patent to another or others which Is pier art wider 35 U.S.C. 102(a) or (e) and which substantially shows or describes but does not claim the same patentable invention, as defined in 37 C.F.R 1.601(n), or a reference to a foreign patent or to a printed publication, the inventor of the subject matter of the rejected claim, the owner of the patent under reexamination, or the party qualified under §§ 1.42, 1.43 or 1.47, may substitute an appropriate oath or declaration to overcome the patent or publication. The oath or declaration must include facts showing a completion of the application in this country or in a NAFTA or WTO member country before the fling date of the application on which the U.S. patent issued, or before the date of the foreign patent, or before the date of the printed publication. When an appropriate oath or declaration is made, the patent or publication cited shall not bar the grant of a patent to the inventor or the confirmation of the patentability of the claims of the patent, unless the date of such patent or printed publication is more than one year prior to the date on which the inventor's or patent owner's application was filed in this country." 37 C.F.R. § 1.131(a)(1).*

NOTE:37 C.F.R § 1.131 Is not applicable to a rejection based on a U.S. patent that CLAIMS the rejected invention.

2. The person making this declaration is (are):

> __X__ the Inventor(s).

> ___ only some of the joint inventor(s)
> *(and a suitable excuse is attached for failure of the omitted joint inventor(s) to sign)*

> ___ the party in interest
> *(and a suitable explanation as why it is not possible to produce the declaration of the inventor(s) is attached)*

FACTS AND DOCUMENTARY EVIDENCE

3.

NOTE: The *showing of facts shall be such, in character and weight as to establish reduction to practice prior to the effective date of the reference, or conception of the invention prior to the effective date of the reference coupled with due diligence from prior to said date to a subsequent reduction to practice or to the filing of the application. 37 C.F.R. § 1.131(b).*

To establish the date of completion of the invention of this application, the following attached documents and/or models are submitted as evidence:

(check all applicable items below)

> ___ sketches
> ___ blueprints
> ___ photographs
> ___ reproduction(s) of notebook entries
> _X_ Disclosure
> ___ supporting statement(s) by witness(es) (where verbal disclosures are the evidence, relied upon)

NOTE: While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See Margenthaler v. Scudder 1897C.D. 724,81 O.G.1417."See also M,P.EP. § 715.07 and § 2138.04, 7th ed.

From these documents and/or models, it can be seen that the invention in this application was made

    __ on _____

    X at least by the date of **June 11, 2001** which is a date earlier than the effective date of the reference.

NOTE: *"If the dates of the exhibits have been removed or blocked off, the matter of dates can be taken care of in the body of the oath or declaration.". M.P.EP § 715.07, 7th ed.*

NOTE: *"[T]he dates in the oath or declaration may be the actual dates ,or, if the applicant or patent owner does not desire to disclose his or her actual dates,, he or she may merely allege that the acts referred to occurred prior to a specified date." M.P.E. P. § 715.07, 7th ed*

DILIGENCE

NOTE: *"Where there has not been reduction to practice prior to the date of the reference, the applicant or patent owner must also show diligence in the completion of his or her invention from a time just prior to the date of the reference continuously up to the date of the actual reduction to practice or up to the date of filing his or her application (filing constitutes a constructive reduction to practice, § 1.131). "M.P.E.P. § 715.07, 6th ed., rev. 3 (emphasis added).*

NOTE: *"A conception of an invention, though evidenced by disclosure, drawings, and even a model, is not a complete invention under the patent laws, and confers no rights on a inventor, and has no effect on a subsequently granted patent to another, UNLESS HE OR SHE FOLLOWS IT WITH REASONABLE DILIGENCE BY SOME OTHER ACT, such as an actual reduction to practice or filing an application for a patent. Automatic Weighing Mach. Co v. Pneumatic Scale Corp., Limited 1909 C.D. 498, 139 O.G. 991, M.P.E.P. §715.07, 7th ed.*
"Conception in the mental part of the inventive act, but it must be capable of proof, as by drawings, complete disclosure to another person, etc., In Mergenthaler v. Scudder, 1897 ca 724 ,81 O.G. 1417, it was established that conception is more than a mere vague idea of how to solve a problem; the means themselves and their interaction must be comprehended also." M.PE.P. § 715.07, 7th ed.

NOTE: *Only diligence before reduction to practice is a material consideration. The "lapse of time between the completion or reduction to practice of an invention and the filing of an application thereon." (Ex parte Merz 74 U.S.P.Q. 296) is not relevant to an affidavit or declaration under 37 C.F. R. § 1.131. M.P.E.P. § 715.07(a), 7th ed.*

Attached is a statement establishing the diligence of the applicants, from the time of their conception, to a time just prior to the date of the reference, up to the:

    __ actual reduction to practice.
    X filing of this application.

TIME OF PRESENTATION OF THE DECLARATION

(complete (a), (b) or (c))

(a) **X** This declaration is submitted prior to final rejection.

(b) __ This declaration is submitted with the first response after final rejection, and is for the purpose of overcoming a new ground of rejection or requirement made in the final rejection.

(c) __ This declaration is submitted after final rejection. A showing under 37 C.F.R. § 1.116(b) is submitted herewith.

DECLARATION

6. As a person signing below:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on Information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

7.   *(complete A or 8 below)*

A. Inventor(s)

Full name of sole or first inventor _____**Debendra Das Sharma**_____

Inventor's signature ____ Debendra Das Sharma _____

Date __8/ 4 | 04____ Country of Citizenship _____India_____

Residence _____2043 ACACIA CT_____

Post Office Address ___SANTA CLARA , CA 95050_____

Full name of second joint inventor, if any _____

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

Full name of third joint inventor, if any _____

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

(use added page for signature by additional inventors)

Number of pages added: _____

(Declaration, of Prior Invention In the United States, or In a NAFTA or WTO Member Country to Overcome
Cited Patent or Publication—37 C.F.R. § 1.151 [g-32] page 4 of 4)

PDNO 10017812   DATE RCVD 6-12-01   ATTORNEY DAP

108

Descriptive Title of Invention:

Enforcing ordering of retried pipelined transactions

Name of Project: Shangrila

OTPE JC48
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JUN 1 2 2001
HP LEGAL DEPT.
CUPERTINO, CA.

Product Name or Number:

Was a description of the invention published, or are you planning to publish? If so, the date(s) and publication(s):

No

Was a product including the invention announced, offered for sale, sold, or is such activity proposed? If so, the date(s) and location(s):

No

Was the invention disclosed to anyone outside of HP, or will such disclosure occur? If so, the date(s) and name(s):

Disclosed to Intel under CDA

If any of the above situations will occur within 3 months, call your IP attorney or the Legal Department now at 1-898-4919 or 970-898-4919.

Was the invention described in a lab book or other record? If so, please identify (lab book #, etc.)

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Was the invention built or tested? If so, the date:

Not yet.

Was this invention made under a government contract? If so, the agency and contract number:

No

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Description of Invention: *Please preserve all records of the invention and attach additional pages for the following. Each additional page should be signed and dated by the inventor(s) and witness(es).*

A.   Prior solutions and their disadvantages (if available, attach copies of product literature, technical articles, patents, etc.).
B.   Problems solved by the invention.
C.   Advantages of the invention over what has been done before.
D.   Description of the construction and operation of the invention (include appropriate schematic, block, & timing diagrams; drawings; samples; graphs; flowcharts; computer listings; test results; etc.)

Signature of Inventor(s): Pursuant to my (our) employment agreement, I (we) submit this disclosure on this date: [6/8/01].

Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
358146	DEBENDRA DAS SHARMA	Debendra Das Sharma	447-0978	42LAB	47CL-2501 (SL/SVTD)
Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name

(If more than four inventors, include additional information on another copy of this form and attach to this document)

EXHIBIT 1

BEST AVAILABLE COPY

Signature of Witness(es): *(Please try to obtain the signature of the person(s) to whom invention was first disclosed.)*
The invention was first explained to, and understood by. me (us) on this date: [   ]

Full Name	Signature	Date of Signature
ASHISH GUPTA	(signature)	6/11/2001
Full Name	Signature	Date of Signature

Inventor & Home Address Information: *(If more than four inventors, include addl. information on a copy of this form & attach to this document)*

Inventor's Full Name
DEBENDRA DAS SHARMA

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2043 ACACIA CT

City		State	Zip
SANTA CLARA	CA		9505 0

Do you have a Residential P.O. Address? P.O. BOX	City	State	Zip

Greeted as *(nickname, middle name, etc.)* DEBENDRA   **Citizenship** INDIA

Inventor's Full Name

Street

City		State	Zip

Do you have a Residential P.O. Address? P.O. BOX	City	State	Zip

Greeted as *(nickname, middle name, etc.)*   **Citizenship**

Inventor's Full Name

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Do you have a Residential P.O. Address? P.O. BOX	City	State	Zip

Greeted as *(nickname, middle name, etc.)*   **Citizenship**

Inventor's Full Name

Street

City		State	Zip

Do you have a Residential P.O. Address? P.O. BOX	City	State	Zip

Greeted as *(nickname, middle name, etc.)*   **Citizenship**

Form 3.1 IDF.DOC Rev. 10/25/99

programmed h/o firmware v/o

1   Enforcing ordering for retried pipelined transactions

A.   Problems solved by the invention

Sometimes enforcing ordering between transactions in a computer system becomes necessary. A good example of this is PIO transactions. PIO Writes coming from a processor should not get out of order for the programming model to work. Processors normally pipeline PIO Writes (issue subsequent PIO Writes without getting the committ for the earlier PIOs) for improved performance. It is left up to the chips in the interconnection network to guarantee that they be delivered in order. Another requirement is the capability to retry (or nack) the transaction if there is not enough resources to serve the transaction request instead of blocking the queue and letting other transactions suffer. The disclosure solves the problem of enforcing ordering for pipelined transactions when they may be retried.

B.   Prior solutions and their disadvantages

Prior solutions had relied on not retrying the pipelined transactions that had ordering requirements. For example, coherent transactions were designed at the protocol level not have any transaction level ordering requirements. They can be retried at the service node. PIO transactions had transaction level ordering requirements. They were not retried even if it meant performance and quality of service issues. A second alternative is to allow only one ordered transaction to be outstanding per source node. That way the destination can retry the transaction without having to worry about getting transactions out of order. This has a negative performance impact since we are single threading ordered transactions, resulting in higher latency and lower throughput / bandwidth.
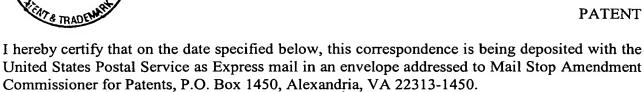
C.   Description of the construction and operation of the invention

The proposed solution is to have a retry bit vector in the destination node that retries. Each bit in the vector corresponds to a source node that can send a transaction. Once set, the bit indicates that the source node has been retried for the ordered transactions in that particular flow-control class. There needs to be one set of vector for each flow control class where we will allow pipelined ordered transactions to be retried. The retry bit vector powers on as reset ('0'). When the destination node retries an ordered transaction, it sets the retry bit ('1'). From that time on, it simply retries every ordered transaction in the same flow control class that is sourced by the node that got retried. When the source gets the retry response, it starts to resend every transaction from the retried transaction onwards (since they are going to be retried anyway). The first retried transaction will have a special bit set in the header to indicate to the destination that this is the first transaction that was retried. When the destination receives, this specially marked transaction, it either accepts it (if it has the resources to deal with the transaction) or retries it again. If it accepts the transaction, it resets the corresponding bit in the retry bit vector.

Once the source node receives the first retry an ordered transaction, it expects to get a retry for every subsequent transaction. It does not take any action for the subsequent retries. However, if a subsequent transaction (that was present when the first retry was received) got retried twice, it means that the destination must have set the retry bit after accepting the first retried transaction. It needs to put the special marker on this transaction and resend all transactions from that transaction onwards. If the first retried transaction got retried, it means that the destination is still rejecting its transaction and it will send all the transactions again overall. The following flowchart demonstrates how the scheme works.

There may be some variants to this scheme. For example, the destination node need not retry subsequent transactions after it has retried the first transaction. It may simply drop all subsequent ordered transactions from the same source till the original retried transaction (identified by the special marker in header) is accepted. The source is aware of this and does not expect to receive any acknowlege for ordered transactions subsequent to the retried one. It may also be possible that the proposed scheme works for an unordered fabric, although the unordered fabric should have enough mechanisms of its own to guarantee ordering when it matters.

Signature of Inventor(s): I (we) this date, _6/8/01_, submit this invention disclosure pursuant to my (our) employment agreement.
emp #: 358946 name: Debendra Das Sharma sign: _Debendra Das Sharma_ Telnet: 447-0978 Entity: 47CL-2501 (CSL/SVID)
emp #:_____ name:_____ sign:_____ Telnet:_____ Entity:_____
Signature of Witness(es): The invention was first explained to and understood by me on _____:
Witness: name: _Ashish Gupta_ sign: _____ date: _6/11/2001_

I hereby certify that on the date specified below, this correspondence is being deposited with the United States Postal Service as Express mail in an envelope addressed to Mail Stop Amendment Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

08-04-04
_____   X _Bourguignon_
Date   Joanne Bourguignon

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Applicant	:	Debendra Das Sharma
Application No.	:	10/011,857
Filed	:	November 5, 2001
For	:	Method and System for Controlling Flow of Ordered, Pipelined Transactions between Intercommunicating Electronic Devices

Examiner	:	Khanh Dang
Art Unit	:	2111
Docket No.	:	10017812-1
Date	:	August 4, 2004

MAIL STOP AMENDMENT
Commissioner for Patents
Washington, DC 20231

<u>STATEMENT OF FACTS ESTABLISHING DILIGENCE RE 37 C.F.R. § 1.131</u>

Sir:

I hereby provide an Invention Disclosure, which establish conception of the invention claimed in claims 1-20 of the above-identified patent application and a reduction to practice of an embodiment of the invention prior to the filing date of the cited reference (July 3, 2001).

2

EXHIBIT 1 – Invention Disclosure dated June 12, 2001;

Inventor:

Debendra Das Sharma

Debendra Das Sharma

_8/4/04_

Date